REMARKS

Claims 31-36 remain for prosecution in the present application.

Statement Concerning Common Ownership

Brozell 6,848,590 is assigned to and owned by Owens-Illinois Closure Inc. At the time the invention of the present application was made, the inventors were under an obligation to assign the invention to Owens-Illinois Prescription Products Inc., and indeed the present application is assigned to and owned by Owens-Illinois Prescription Products Inc. Owens-Illinois Prescription Products Inc. and Owens-Illinois Closure Inc. were at that time and are now both wholly owned subsidiaries of OI Plastic Products FTS Inc. Therefore, pursuant to 35 USC 103(c) and MPEP 706.02(l)(2)(Example 1), the Brozell patent is not prior art to the present application.

Claim Rejections - 35 USC 112

Claim 30 has been canceled from the present application, vitiating the rejection under 35 USC 112.

The Present Invention

The present invention is directed to a child-resistant package and to a closure for such a package. As recited in new independent claim 31, the package includes a container having a finish with at least one external thread, at least one pocket in an undersurface of the external thread, and an axially facing end surface surrounding a container mouth. The closure has a base wall, a skirt with an axis, at least one internal thread and at least one lug on the internal thread for receipt in the pocket. A spring is disposed between the base wall and the end surface of the container finish to bias the

closure away from the container finish and urge the lug into the pocket. In accordance with the distinguishing feature of the present invention, the spring is a progressive spring that includes at least two circumferentially continuous concentric flexible resilient conical spring rings extending from the base wall at identical angles to the axis of the closure skirt. The spring rings are radially spaced from each other, and a first of the spring rings has a greater axial dimension than a second of the spring rings and axially and radially overlaps the second spring ring. This construction is such that, upon threaded application of the closure to the container finish, the first spring ring is engaged by the end surface of the finish. Upon further application of the closure to the finish, the first spring ring is bent into engagement with the second spring ring such that forces applied by the first spring ring to the end surface, both to seal the package and to bias the closure away from the finish, is a progressive sum of forces generated in the first and second spring rings. The first spring ring, but not the second spring ring, contacts the end surface of the container.

Dependent claim 32 additionally recites that the spring rings are of differing thicknesses, with the first spring ring being thicker than the second spring ring. These differing thicknesses, combined with the differing lengths of the spring rings, gives the spring rings differing spring rates.

Dependent claim 33 additionally recites that the progressive spring includes a third circumferentially continuous flexible resilient spring ring disposed adjacent to the second spring ring and remote from the first spring ring. The third spring ring extends from the closure base wall at an angle to the skirt axis that is identical to that of the first and second spring rings. The third spring ring is of lesser axial dimension than the second spring ring. The second spring ring axially and radially overlaps the third spring ring such

that, upon continued threaded application of the closure to the container finish, the second spring ring is bent into engagement with the third spring ring, and the spring forces applied by the first spring ring to the finish end surface are a progressive sum of forces generated in the first, second and third spring rings. The first spring ring, but not the second or third spring ring, contacts the end surface of the container.

Claims 34-36 are directed to the closure and contain limitations corresponding to claims 31-33 respectively.

The use of multiple spring elements in accordance with the present invention allows the spring force applied to the container finish end surface to increase progressively as a function of closure application. This load share principle is not disclosed in the prior art. Furthermore, the ability to tailor the spring rates of the progressive elements provides enhanced control of the forces applied by the spring rings to the finish end surface. Only the first spring ring, having the greatest axial dimension and overlapping at least the second spring ring, contacts the finish end surface. The property of plastic materials to relax over time under load conditions is overcome by the use of multiple spring rings.

Claim Rejections - Prior Art

The claims of the application as filed were rejected over Brozell 6,848,590 combined with McIntosh 3,286,866, and over the combination of Cooke 4,139,112, Kusz 5,803,287 and McIntosh. Marks 3,815,771 was cited relative to dependent claims.

As noted above, the Brozell patent is not prior art to the present application.

Cooke discloses a child-resistant package that includes a lug/gap arrangement between the threads of the closure skirt and the container finish. A resilient

sealing liner 18 functions both to seal the package and to bias the closure lugs into the gaps in the container finish thread.

Kusz is cited for its disclosure in FIGS. 11 and 12 that a compressible sealing liner 41a in FIG. 11 can be replaced by a flexible annular flange 41b in FIG. 12 to seal against the end surface of the container neck finish. This is mere replacement of a liner seal with a linerless seal.

McIntosh apparently is cited for its disclosure of resilient bead 24 and resilient sleeve 26. These elements sequentially engage as the closure is threaded onto the container finish to seal against the end surface of the container finish. The purpose of this arrangement, as described at column 3, line 42+, is to urge the sleeve 26 into engagement with depressions 19 in the end surface 18 so that the package is sealed independently of such depressions.

With respect to independent claim 31 of the present application, the bead 24 in McIntosh is not conical, and the bead 24 and the sleeve 26 are not at identical angles to the axis of the closure skirt 22. Furthermore, inasmuch as the bead 26 in McIntosh functions as a resilient stop and not as an element of a progressive spring, there would be no motivation or reason to revise the geometry of the McIntosh bead 24 in the manner recited in claim 31. In this respect, it is noted that the elements 24,26 in McIntosh function strictly as a seal and not as a spring. The same is true of the linerless seal arrangement of Kusz FIG. 12, so there is no motivation or reason to combine either Kusz or McIntosh with Cooke that requires a spring function to bias the closure away from the finish for child-resistant operation. In this respect, it also is noted that Kusz discloses a squeeze-and-turn child-resistant package, and not a push-and-turn package that requires a spring force to

bias the closure away from the container - i.e., an entirely different and non-analogous child-resistance technique.

Dependent claim 32 recites that the spring rings are of differing thicknesses, with the first or axially longer spring ring being thicker than the second spring ring. This feature allows for tailoring the progressive characteristics of the spring as the closure is applied to the container.

Dependent claim 33 recites that the progressive spring includes a third circumferentially continuous spring ring adjacent to the second spring ring and being of lesser axial dimension than the second spring ring. The third spring ring is at an identical angle to the axis of the skirt as are the first and second rings, and the second spring ring axially and radially overlaps the third spring ring to enhance the progressive characteristics of the spring. Again, only the first spring ring engages the end surface of the container finish. The Examiner has cited the Marks patent for disclosure of three seal elements 6,7,8 in FIG. 3 for example. It will be noted that these seal elements extend axially from the closure base wall in FIG. 3, and are not conical or at identical angles to the base wall. None of the seal elements axially overlap as shown in FIG. 3. More importantly, as clearly shown in FIG. 4, the three seal rings operate completely independently of each other, which is to say that there is no progressive spring action developed as the closure is applied to the container finish. Indeed, all three rings engage the end surface of the container finish independently of each other.

Claims 33-36 are directed to the closure and of itself, and contain recitations concerning the spring elements identical to those in claims 31-33 discussed in detail above.

It therefore is believed and respectfully submitted that all claims 31-36 remaining in the application are allowable at this time, and favorable action is respectfully solicited.

Please charge any fees associated with this submission to Account No. 15-0875 (Owens-Illinois).

Respectfully submitted,

REISING, ETHINGTON, BARNES,
KISSELLE, P.C.

By _____

Robert C. Collins
Reg. No. 27,430
Telephone (248) 689-3500
Facsimile (248) 689-4071